

Claims

- [c1] 1. An apparatus capable of emitting both far infrared radiation and negative ions, the apparatus comprising:
 a conduit through which a fluid can flow; and
 a material capable of emitting both far infrared radiation and negative ions wherein the material is adaptedly coupled to the conduit such that an effective amount of the far infrared radiation and negative ions is introduced into the fluid flowing through the conduit.
- (A) 2. The apparatus of Claim 1, wherein the fluid is selected from the group consisting of a gas, air, a liquid, natural gas, water, a liquid fuel source, a gaseous fuel source and combinations thereof.
- (1) 3. The apparatus of Claim 1, wherein the material is selected from the group consisting of a single material having one or more constituents and a combination of two or more materials.
- (1) 4. The apparatus of Claim 1, wherein the material includes a first part including a bio-ceramic in an amount of about 95% by weight or less and a second part including a ceramic oxide in an amount of about 5% by weight or more.
- (1) 5. The apparatus of Claim 4, wherein the first part comprises at least one compound selected from the group consisting of silicon oxide, aluminum oxide, iron oxide, magnesium oxide, derivatives thereof and combinations thereof.
- (1) 6. The apparatus of Claim 4, wherein the ceramic oxide is selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.
- (1) 7. The apparatus of Claim 1, wherein the conduit is selected from the group consisting of a fuel line, a gas line, an air line, an exhaust pipe and combinations thereof.
- (1) 8. A system for enhancing fuel combustion efficiency, the system comprising:

a device including a fuel combustion engine having a conduit through which a fluid can flow; and

a material capable of emitting both far infrared radiation and negative ions wherein the material is adaptedly coupled to the conduit such that an effective amount of the far infrared radiation and negative ions are introduced into the fluid flowing through the conduit.

[c9] 9. The system of Claim 8, wherein the fluid is selected from the group consisting of a gas, air, a liquid, natural gas, water, a liquid fuel source, a gaseous fuel source and combinations thereof.

[c10] 10. The system of Claim 8, wherein the material is selected from the group consisting of a single material having one or more constituents and a combination of two or more materials.

[c11] 11. The system of Claim 8, wherein the material includes a first part including a bio-ceramic in an amount of about 95% by weight or less and a second part including a ceramic oxide in an amount of about 5% by weight or more.

[c12] 12. The system of Claim 11, wherein the first part comprises at least one compound selected from the group consisting of silicon oxide, aluminum oxide, iron oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c13] 13. The system of Claim 11, wherein the ceramic oxide is selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c14] 14. The system of Claim 8, wherein the conduit is selected from the group consisting of a fuel line, an air line, an exhaust line and combinations thereof.

[c15] 15. The system of Claim 8, wherein the device is selected from the group consisting of an automobile, a truck, farm equipment, lawn equipment, } OBMD
construction equipment and combinations thereof.

[c16] 16. A device for an internal combustion engine having a fluid line

through which fluid can flow, the device comprising a material capable of emitting far infrared radiation and negative ions wherein the material is so constructed and arranged such that the material substantially contacts at least a portion of the fluid line allowing an effective amount of the far infrared radiation and negative ions to be emitted into the fluid.

- [c17] 17. The device of Claim 16, wherein the material is selected from the group consisting of a single material having one or more constituents and a combination of two or more materials.
- [c18] 18. The device of Claim 16, wherein the material includes a first part including about 95% by weight or less of a bio-ceramic and a second part including a ceramic oxide in an amount of about 5% by weight or more.
- [c19] 19. The device of Claim 18, wherein the first part comprises at least one compound selected from the group consisting of silicon oxide, aluminum oxide, iron oxide, magnesium oxide, derivatives thereof and combinations thereof.
- [c20] 20. The device of Claim 18, wherein the ceramic oxide is selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.
- [c21] 21. The device of Claim 16, wherein the device includes a substrate onto which the material is applied such that the material substantially contacts at least a portion of an exterior of the fluid line. *13 metal*
- [c22] 22. The device of Claim 21, wherein the substrate is selected from the group consisting of a fabric, a polymer, a metal, an alloy, glass and combinations thereof.
- [c23] 23. The device of Claim 16, wherein the material is shaped into a rigid body such that the material is adaptedly coupled to the internal combustion engine allowing fluid within the fluid line to be exposed to an effective amount of far infrared radiation and negative ions prior to combustion.
- [c24] 24. The device of Claim 16, wherein the internal combustion engine powers a motorized vehicle selected from the group consisting of an

(15)

automobile, a truck, farm equipment, lawn equipment, construction equipment and combinations thereof.

[c25]

(15)

25. The device of Claim 24, wherein the device is capable of enhancing fuel efficiency of the motorized vehicle.

[c26]

(15)

26. The device of Claim 24, wherein the device is capable of reducing emissions during operation of the motorized vehicle.

[c27]

(1)

27. The device of Claim 16, wherein the fluid is selected from the group consisting of a gas, air, a liquid, natural gas, water, a liquid fuel source, a gaseous fuel source and combinations.

[c28]

(1)

28. The device of Claim 16, wherein fluid line is selected from the group consisting of a fuel line, a gas line, an air line, an exhaust line and combinations thereof.

[c29]

(oly)

29. The device of Claim 16, wherein the material includes a FIR/negative ion material emitting body that has a generally cylindrical shape with a plurality of apertures through which the fluid can flow.

[c30]

(AC)

30. The device of Claim 29, wherein the FIR/negative ion material emitting body is insertable within an exhaust line associated with the internal combustion engine.

[c31]

(1)

31. A fluid line for an internal combustion engine comprising:
at least a portion of the fluid line and a material capable of emitting both far infrared radiation and negative ions adaptedly coupled to the portion of the fluid line allowing an effective amount of the far infrared radiation and the negative ions to be emitted into fluid passing through the fluid line during operation.

[c32]

(1)

32. The fluid line of Claim 21, wherein the material is selected from the group consisting of a single material having one or more constituents and a combination of two or more materials.

[c33]

33. The fluid line of Claim 31, wherein the material includes a first part

(1)

including a bio-ceramic in an amount of about 95% by weight or less and a second part including a ceramic oxide in an amount of about 5% by weight or more.

[c34]

(1)

34. The fluid line of Claim 33, wherein the first part comprises at least one compound selected from the group consisting of silicon oxide, aluminum oxide, iron oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c35]

(1)

35. The fluid line of Claim 33, wherein the ceramic oxide is selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c36]

(15)

36. The fluid line of Claim 31 wherein the material is an integral part of the fluid line. ^{2BMD}

[c37]

(1)

37. The fluid line of Claim 31 wherein the material is a separate component of the fluid line attached to the portion of the fluid line in substantial contact to at least one of an interior and exterior thereof.

[c38]

(1)

38. The fluid line of Claim 31, wherein the fluid line is selected from the group consisting of a gas line, a fuel line, an air line, an exhaust line and combinations thereof.

[c39]

(1)

39. A method for increasing fuel efficiency of an internal combustion engine comprising the steps of:

coupling a device including a material capable of emitting far infrared radiation and negative ions to a fluid line of the internal combustion engine; operating the internal combustion engine; and emitting an amount of the far infrared radiation and negative ions into the fluid flowing through the fluid line effective to increase fuel efficiency during operation.

[c40]

(1)

40. The method of Claim 39, wherein the material at least includes about 95% or less by weight of a bio-ceramic material and about 5% by weight or less of an oxide material selected from the group consisting of iron oxide, silicon

- (1) oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.
- [c41] (1) 41. The method of Claim 39, wherein the material is selected from the group consisting of a single material having one or more constituents, and a combination of two or more materials.
- [c42] (1) 42. The method of Claim 39, wherein the device is attached around a portion of an exterior of the fluid line.
- [c43] (1) 43. The method of Claim 42, wherein the fluid line is selected from the group consisting of an air line, a gas line, a fuel line, an exhaust line and combinations thereof.
- [c44] (30) 44. The method of Claim 43, wherein the material is inserted into the exhaust line.
- [c45] 45. A method of reducing exhaust emissions of an internal combustion engine comprising the steps of:
 coupling a device including a material capable of emitting both FIR and negative ions to a fluid line of the internal combustion engine;
 (1) operating the internal combustion engine; and
 emitting an amount of the FIR and negative ions into fluid flowing through the fluid line effective to reduce exhaust emissions during operation.
- [c46] (1) 46. The method of Claim 45, wherein the material at least includes about 95% or less by weight of a bio-ceramic material and about 5% by weight or less of an oxide material selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.
- [c47] (1) 47. The method of Claim 45, wherein the material is selected from the group consisting of a single material with one or more constituents, and a combination of two or more materials.
- [c48] (1) 48. The method of Claim 45, wherein the device is flexibly wrapped around an exterior of the fluid line.

[c49] 49. The method of Claim 45, wherein the material is inserted into the exhaust line.

[c50] 50. The method of Claim 47, wherein the fluid line is selected from the group consisting of an air line, a gas line, a fuel line, an exhaust line and combinations thereof.

[c51] 51. A method for enhancing natural gas combustion comprising the steps of:
coupling a device including a material capable of emitting far infrared radiation and negative ions to a natural gas combustion machine;
operating the natural gas combustion machine; and
emitting the far infrared radiation and negative ions into natural gas flowing into the machine in an effective amount to enhance combustion.

[c52] 52. The method of Claim 51, wherein the material at least includes about 95% or less by weight of a bio-ceramic material and about 5% by weight or less of an oxide material selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c53] 53. The method of Claim 51, wherein the material is selected from the group consisting of a single material having one or more constituents, and a combination of two or more materials.

[c54] 54. The method of Claim 51, wherein the device includes a columnated structure allowing the material to be arranged in a packed-bed formation through which natural gas can flow during operation.

[c55] 55. A method for purifying water comprising the steps of:
providing a material capable of emitting both far infrared radiation and negative ions;

adding the material in an effective amount to the water; and
emitting far infrared radiation and negative ions into the water.

[c56] 56. The method of Claim 55, wherein the water is derived from an

aqueous process stream selected from the group consisting of a recreational water stream and an industrial water stream.

[c57] 57. The method of Claim 55, wherein the material at least includes about 95% by weight of a bio-ceramic and about 5% by weight of a ceramic oxide selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.

[c58] 58. A method of purifying water comprising the steps of:
providing a material capable of emitting both far infrared radiation and negative ions;
coupling the material to a water supply line through which water flows;
and
emitting the far infrared radiation and negative ions into the water as it flows through the water supply line.

[c59] 59. The method of Claim 51, wherein the water is derived from an aqueous process stream selected from the group consisting of a recreational water stream and an industrial water stream.

[c60] 60. The method of Claim 51, wherein the material at least includes about 95% by weight of a bio-ceramic and about 5% by weight of a ceramic oxide selected from the group consisting of iron oxide, silicon oxide, titanium oxide, aluminum oxide, magnesium oxide, derivatives thereof and combinations thereof.